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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
JIANMIN QIAO : EXAMINER: SCHILLINGER, LAURA M.
SERIAL NO: 10/765,072 :
FILED: JANUARY 28, 2004 : GROUP ART UNIT: 2813
FOR: DUAL DAMASCENE STRUCTURE :
AND METHOD OF MAKING

PRE-APPEAL BRIEF REQUEST FOR REVIEW

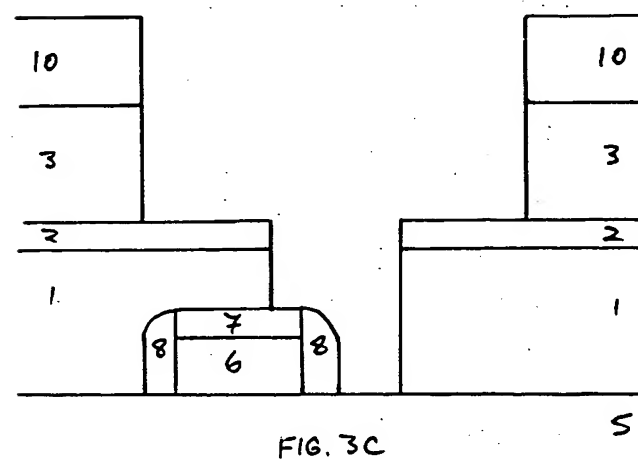
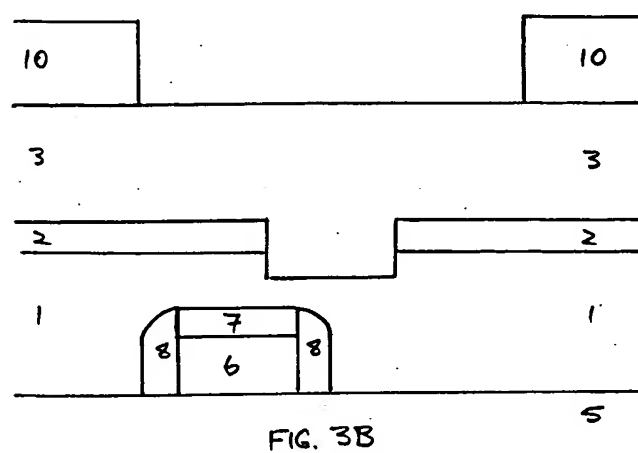
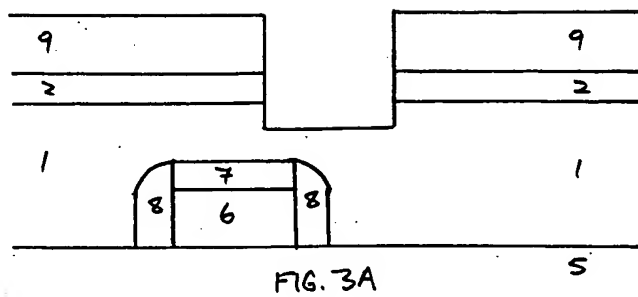
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SIR:

Claims 11-12, 14 and 18 are pending in this application. Claims 11 and 12 are independent. Claims 12 and 14 are withdrawn from consideration as non-elected species.

The present invention provide a method of making a dual damascene structure using an etch chemistry containing $C_2H_2F_4$ that provides sufficient etch selectivity between undoped silicon oxide and various doped oxides for the undoped silicon oxide to act as an etch stop layer. Specification at page 4, lines 8-15.

In the embodiments of independent Claims 11 and 12, as illustrated in FIGS. 3A-3C, reproduced below, an etch stop layer 2 is deposited on a contact dielectric layer 1, a hole is formed through the etch stop layer 2, a trench dielectric layer 3 is deposited in the hole through the etch stop layer 2, and the trench dielectric layer 3 is etched with a chemistry containing $C_2H_2F_4$.



Claim 11 is rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,399,512 ("Blosse"). Blosse discloses a method of making metallization and contact structures in an integrated circuit comprising an etch stop layer. Blosse at title. The Blosse method starts with the semiconductor structure shown in FIG. 1, reproduced below.

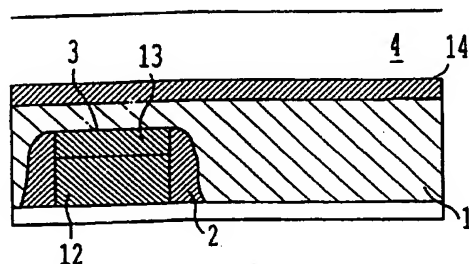


FIG. 1

The semiconductor structure illustrated in FIG. 1 includes a contact dielectric layer 1, an etch stop layer 14, and a trench dielectric layer 4. Blosse discloses sequentially etching, through contact opening mask 7, a hole through trench dielectric layer 4, etch stop layer 14 and contact dielectric layer 1, as shown in FIGS. 6-7, reproduced below.

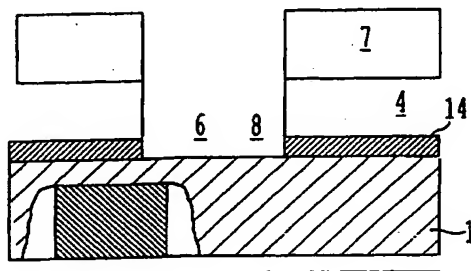


FIG. 6

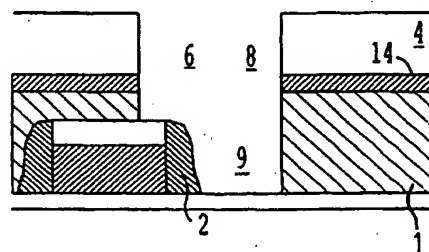


FIG. 7

FIGS. 1 and 6-7 show that Blosse discloses depositing trench dielectric layer 4 *before* forming a hole in etch stop layer 14.

However, Blosse fails to disclose the feature implicit in independent Claim 11 that the trench dielectric layer is deposited *after* forming a hole in the etch stop layer.

In particular, Blosse fails to suggest the independent Claim 11 limitations of "etching a trench dielectric layer and a contact dielectric layer in a structure comprising ... an etch stop layer ... having a hole therein, the hole containing a trench dielectric layer material".

During the July 27, 2005, personal interview, the Examiner suggested that Blosse discloses these limitations because assertedly the trench dielectric layer material on the surface of the hole etched through Blosse's trench dielectric layer 4 is contained within the hole in Blosse's etch stop layer 14. The Examiner appears to maintain this assertion in the Final Rejection.

Applicants respectfully traverse this assertion.

Blosse's etch stop layer 14 is flat. In order for Blosse's flat etch stop layer 14 to have a hole, as required by independent Claim 11, etch stop layer material must be removed from etch stop layer 14, leaving a region free of etch stop layer material between two planes respectively passing through the top and bottom surfaces of Blosse's flat etch stop layer 14. In order for this etch stop layer hole to contain trench dielectric layer material, also as required by independent Claim 11, the etch stop layer-free region between the two surface planes must contain trench dielectric layer material. Because the trench dielectric layer material of Blosse's trench dielectric layer 4 is not contained between the two planes respectively passing through the top and bottom surfaces of Blosse's flat etch stop layer 14, Blosse fails to suggest the independent Claim 11 limitations of "etching a trench dielectric layer and a contact dielectric layer in a structure comprising ... an etch stop layer ... having a hole therein, the hole containing a trench dielectric layer material".

Because Blosse fails to suggest all of the limitations of independent Claim 11, the rejection over Blosse should be withdrawn.

Claim 18 is further patentably distinguishable over Blosse. Blosse fails to suggest the Claim 18 limitation of "partially etching the contact dielectric layer before the trench dielectric layer is etched".

After independent Claim 11 is allowed, Applicants respectfully request rejoinder, examination and allowance of withdrawn Claims 12 and 14. Independent Claim 12 recites "forming a hole through the etch stop layer; depositing a trench dielectric layer ... in the hole through the etch stop layer". Thus, like independent Claim 11, independent Claim 12 features an etch stop layer having a hole containing a trench dielectric layer material. This feature is not suggested by Blosse.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Respectfully submitted,

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